

Position Development Conference of the International Society for Clinical Densitometry. Vancouver, BC, July 15-17, 2005

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ABSTRACT. Every 2 years the International Society for Clinical Densitometry (ISCD) organizes a position development conference at which a panel of experts reviews topics of interest in the field of bone densitometry and proposes Official Positions of the ISCD. In July 2005, the most recent conference was held in Vancouver, Canada, during which 4 topics were discussed: (1) Cross-calibration of dual energy x-ray absorptiometry (DXA) systems, (2) Vertebral fracture assessment, (3) World Health Organization (WHO) classification of bone density for populations other than postmenopausal women, and (4) WHO classification for varying skeletal sites. The Official Positions reached at this conference enumerated in this report have been published in *The Journal of Clinical Densitometry*, and can be found at www.iscd.org. (*J Rheumatol* 2006;33:2319–21)

Key Indexing Terms:

DUAL ENERGY X-RAY ABSORPTIOMETRY

OSTEOPOROSIS

FRACTURE

INTRODUCTION

The assessment of skeletal mass has become an important part of the identification of individuals at increased risk for fracturing¹. Several technologies are now available for the measurement of bone mass, the most widely used of which is bone densitometry by dual-energy x-ray absorptiometry (DXA). However, as technologies have developed and as various manufacturers have created new hardware and software for measuring bone density, differences in the values obtained for bone mass have occurred². This has led to inconsistency in bone mass acquisition, analysis, and interpretation.

The International Society for Clinical Densitometry (ISCD) is a nonprofit organization of over 6000 health care professionals. The stated purposes of the ISCD are to promote professional education in the assessment of skeletal health, to ensure high quality in bone mass measurement, and to improve patient care through appropriate utilization of bone densitometry³.

Every 2 years the ISCD holds a position development conference (PDC), during which an international panel of experts explores areas of controversy and inconsistent practice in the field of bone densitometry and makes recommendations for a more consistent approach to applications in this field^{4,5}.

In July 2005, the third PDC was held in Vancouver, BC, Canada. The following topics were discussed and positions developed:

1. Cross-calibration of DXA systems
2. Vertebral fracture assessment
3. World Health Organization (WHO) classification of bone density for populations other than postmenopausal women
4. WHO classification for varying skeletal sites

METHODS

Starting shortly after the 2003 PDC, a chair and co-chairs of the steering committee for the 2005 conference were selected by the Executive Committee of the ISCD. This committee sought topics for the 2005 conference from the membership of the ISCD and other experts in the field of bone densitometry. These topics were reviewed by the ISCD Scientific Advisory Committee (SAC). Four topic areas were selected and each was assigned to a subcommittee of experts that included members of the SAC. Each subcommittee performed a search of the medical literature using a method modified from the Cochrane reviews⁶ utilizing electronic databases including Medline, EMBASE, and PubMed. Each subcommittee developed an in-depth comprehensive report reviewing the topic and suggesting Official Positions.

A group of internationally recognized experts selected by

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the PDC steering committee were asked to participate as members of the expert panel. The American Society of Bone and Mineral Research and the International Osteoporosis Foundation each selected a representative for the panel to review the reports of the PDC subcommittees and reach agreement on a final position. Each position was initially graded by the PDC subcommittees for 3 attributes:

1. Quality of the available literature

Good: Evidence includes consistent results from well conducted studies in representative populations.

Fair: Evidence is sufficient to determine effects on outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies.

Poor: Evidence is insufficient to assess the effects on outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information.

2. Strength of the recommendation

- A. Strong recommendation supported by the evidence.
- B. Recommendation supported by the evidence.
- C. Recommendation supported primarily by expert opinion.

3. Applicability

- 1. Applicability worldwide.
- 2. Applicability varies according to locale and local requirements.

Final grading was determined by the expert panel. Although the highest level of evidence was sought, it is the nature of the process that for several topics there was neither clear literature nor consistent practice. It was the role of the expert panel to reach agreement for best practice derived from the literature available at the time of the conference. Agreement was defined for the conference as an affirmative vote by two-thirds of the panel members.

The format of the PDC was similar to that of the previous conferences of the ISCD^{4,7}. On the first day, each PDC subcommittee made a presentation to the panel of experts, each topic was discussed in depth, and changes were made to the positions if there was agreement by the panel. An open forum was held the second day at which testimony was offered by other members of the scientific community, members of ISCD, and members of industry. On day 3, the panel reviewed all the previous proceedings, and final positions were developed with 2/3 agreement of the panel on each position and on the final document. These final positions were then accepted by the ISCD Board of Directors and thus became Official Positions of the organization.

The following are the additional Official Positions developed at the 2005 PDC. The new Official Positions, in bold print, have been incorporated into previous positions of the ISCD. Some of these previous Official Positions, which lend context to the new Official Positions, have been included in the following summary. The complete listing of the ISCD Official Positions may be found on the website www.ISCD.org or Reference 5.

OFFICIAL POSITIONS

Central DXA for Diagnosis

• **The WHO (World Health Organization) international reference standard for osteoporosis diagnosis is a T-score of -2.5 or less at the femoral neck.**

Grade: Good-A-1

• **Osteoporosis may be diagnosed in postmenopausal women and in men age 50 and older if the T-score of the lumbar spine, total hip, or femoral neck is -2.5 or less:***
* **Other hip regions of interest, including Ward's area and the greater trochanter, should not be used for diagnosis. Application of recommendation may vary according to local requirements.**

Grade: Fair-B-2

• **Skeletal Sites to Measure**

Measure bone mineral density (BMD) at both the posterior-anterior (PA) spine and hip in all patients.

Measure forearm BMD under the following circumstances:

- Hip and/or spine cannot be measured or interpreted
- Hyperparathyroidism
- Very obese patients (over the weight limit for DXA table)
- Spine Region of Interest

Use PA L1-L4 for spine BMD measurement.

Use all evaluable vertebrae.

If only one evaluable vertebra remains after excluding other vertebrae, diagnosis should be based on a different valid skeletal site.

Grade: Fair-B-1

Anatomically abnormal vertebrae may be excluded from analysis if:

- **They are clearly abnormal and non-assessable within the resolution of the system; or**
- **There is more than a 1.0 T-score difference between the vertebra in question and adjacent vertebrae**
- **When vertebrae are excluded, the BMD of the remaining vertebrae is used to derive the T-score**

Grade: Poor-C-1

• **Hip Region of Interest**

Use femoral neck or total proximal femur, whichever is lowest.

Grade: Fair-B-2

BMD may be measured at either hip.

• **Forearm Region of Interest**

Use 33% radius (sometimes called one-third radius) of the non-dominant forearm for diagnosis. Other forearm regions of interest are not recommended.

Fracture Risk Assessment

For fracture risk assessment any well-validated technique can be used, including measurements of more than one site, where this has been shown to improve the assessment of risk.

Grade: Good-A-1

Use of the Term "Osteopenia"

The term "osteopenia" is retained, but "low bone mass" or

“low bone density” is preferred.

People with low bone mass or density are not necessarily at high fracture risk.

Grade: Poor-C-1

BMD Reporting in Postmenopausal Women and Men Age \geq 50 Years

T-scores are preferred.

The WHO densitometric classification is applicable.

Grade: Fair-B-1

BMD Reporting in Women Prior to Menopause and Men Age < 50 Years

Z-scores, not T-scores, are preferred. This is particularly important in children.

A Z-score of -2.0 or lower is defined as “below the expected range for age” and a Z-score above -2.0 is “within the expected range for age.”

Grade: Poor-C-1

Precision Assessment

Each DXA facility should determine its precision error and calculate the least significant change (LSC).

The precision error supplied by the manufacturer should not be used.

If a DXA facility has more than one technologist, an average precision error, combining data from all technologists, should be used to establish precision error and LSC for the facility, provided the precision error for each technologist is within a pre-established range of acceptable performance.

Every technologist should perform an *in vivo* precision assessment using patients representative of the clinic’s patient population.

Each technologist should do one complete precision assessment after basic scanning skills have been learned (e.g., manufacturer training) and after having performed approximately 100 patient scans.

A repeat precision assessment should be done if a new DXA system is installed.

A repeat precision assessment should be done if a technologist’s skill level has changed.

The minimum acceptable precision for an individual technologist is:

- **Lumbar Spine: 1.9% (LSC = 5.3%)**
- **Total Hip: 1.8% (LSC = 5.0%)**
- **Femoral Neck: 2.5% (LSC = 6.9%)**
- **Retraining is required if a technologist’s precision is worse than these values.**

Grade: Good-B-1

BMD Comparison Between Facilities

It is not possible to quantitatively compare BMD or to calculate a least significant change between facilities without cross-calibration.

Grade: Poor-C-1

Indications for Vertebral Fracture Assessment (VFA)

Consider VFA when the results may influence clinical management.

When BMD measurement is indicated, performance of VFA should be considered in clinical situations that may be associated with vertebral fractures. Examples include:

- Documented height loss of greater than 2 cm (0.75 in) or historical height loss greater than 4 cm (1.5 in) since young adulthood
- History of fracture after age 50 years
- Commitment to longterm oral or parenteral glucocorticoid therapy
- History and/or findings suggestive of vertebral fracture not documented by prior radiologic study.

Grade: Good-B-1

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